

CLAIMS

What is claimed is:

1. A method of call handling in a wireless communication network comprising:  
receiving an incoming voice call for a mobile station that is busy in a  
data call; and  
sending an incoming call notification to the mobile station via signaling over an  
existing traffic channel allocated to the data call.
2. The method of claim 1, further comprising routing the incoming voice call to voice  
mail in conjunction with sending the call notification to the mobile station.
3. The method of claim 1, further comprising including calling party identification in  
the incoming call notification sent to the mobile station.
4. The method of claim 1, further comprising reconfiguring the existing traffic  
channel to support the incoming voice call, and delivering the incoming voice call to the  
mobile station via the reconfigured existing traffic channel.
5. The method of claim 4, further comprising, if the data call was a circuit-switched  
data call, continuing with a data transaction associated with the data call via control  
signaling on the reconfigured existing traffic channel.
6. The method of claim 4, further comprising, if the data call was a packet data call,  
suspending or ending a data transaction associated with the data call.

7. The method of claim 1, further comprising, if a call delivery attempt is desired, reconfiguring the existing traffic channel for use in delivering the incoming voice call to the mobile station.
8. The method of claim 7, wherein reconfiguring the existing traffic channel for use delivering the incoming voice call to the mobile station comprises establishing a new service option connection at a network Base Station (BS), and requesting a network Mobile Switching Center (MSC) to establish a voice connection for the incoming voice call.
9. The method of claim 8, further comprising determining whether the data call is, in a first case, a circuit-switched data call or, in a second case, is a packet data call, and in the second case requiring a return indication from the mobile station that indicates call delivery is desired before renegotiating the existing traffic channel, and in the first case renegotiating the existing traffic channel without requiring the return indication that call delivery is desired.

10. A method of call handling in a wireless communication network comprising:  
receiving an incoming voice call indication at a Base Station (BS) that is targeted  
to a mobile station busy in a data call; and  
determining if the data call is a packet-switched data call or a circuit-switched  
data call;  
if the data call is a circuit-switched data call, reconfiguring a service connection of  
the mobile station to deliver the incoming voice call using an existing  
traffic channel previously allocated to the data call; and  
if the data call is a packet-switched data call, sending a call notification message  
to the mobile station and, responsive to receiving a return  
acknowledgment from the mobile station, reconfiguring the service  
connection of the mobile station to deliver the incoming voice call using  
the existing traffic channel.
11. The method of claim 10, further comprising, if the data call is a circuit-switched  
data call, continuing a data transaction associated with the data call after connecting the  
incoming voice call over the existing traffic channel via signaling over the existing traffic  
channel.
12. The method of claim 10, further comprising, if the data call is a packet-switched  
data call, suspending a packet data service associated with the packet data call.
13. The method of claim 10, further comprising, if the data call is a packet-switched  
data call, releasing a packet data service associated with the packet data call.

14. The method of claim 10, further comprising determining whether the data call is a circuit-switched data call or a packet-switched data call based on examining a current service option connection of the mobile station that is associated with the data call.

15. The method of claim 10, wherein reconfiguring a service connection of the mobile station to deliver the incoming voice call using an existing traffic channel previously allocated to the data call comprises:

- sending a voice service call setup request to a Mobile Switching Center (MSC);
- receiving a voice circuit assignment from the MSC;
- establishing a voice service option connection at the BS to support the incoming voice call; and
- alerting the mobile station to inform the mobile station that the incoming voice call is setup.

16. The method of claim 15, wherein sending a voice service call setup request message to a Mobile Switching Center (MSC) comprises generating default voice service parameters at the BS rather than receiving requested voice service parameters from the mobile station.

17. A Base Station (BS) to provide a call handling in a wireless communication network, the BS comprising:
- call processing and interface circuits configured to provide voice and data call handling for a plurality of mobile stations; and
  - a notification processor configured to:
    - receive an incoming voice call indication at a Base Station (BS) that is targeted to a mobile station busy in a data call; and
    - determine if the data call is a packet-switched data call or a circuit-switched data call;
    - if the data call is a circuit-switched data call, reconfigure a service connection of the mobile station to deliver the incoming voice call using an existing traffic channel previously allocated to the data call; and
    - if the data call is a packet-switched data call, send a call notification message to the mobile station and, responsive to receiving a return acknowledgment from the mobile station, reconfigure the service connection of the mobile station to deliver the incoming voice call using the existing traffic channel.
18. The BS of claim 17, wherein the BS is configured to continue a data transaction associated with the data call after connecting the voice call by signaling over the existing traffic channel, if the data call was a circuit-switched data call.
19. The BS of claim 17, wherein the BS is configured to suspend a packet data service associated with the data call after connecting the incoming voice call if the data call was a packet-switched data call.

20. The BS of claim 17, wherein the BS is configured to release a packet data service associated with the data call after connecting the incoming voice call if the data call was a packet-switched data call.

21. The BS of claim 17, wherein the BS is configured to determine whether the data call is a circuit-switched data call or a packet-switched data call based on examining a current service option connection of the mobile station that is associated with the data call.

22. The BS of claim 17, wherein the BS reconfigures a service connection of the mobile station to deliver the incoming voice call using an existing traffic channel previously allocated to the data call based on:

- sending a voice service call setup request to a Mobile Switching Center (MSC);
- receiving a voice circuit assignment from the MSC;
- establishing a voice service option connection at the BS to support the incoming voice call; and
- alerting the mobile station to inform the mobile station that the incoming voice call is setup.

23. The BS of claim 22, wherein the BS is configured to send the voice service call setup request message to a Mobile Switching Center (MSC) as an additional services request message that includes default voice service parameters generated by the BS rather than by receiving requested voice service parameters from the mobile station.

24. A method of call handling in a mobile station for use in a wireless communication network, the method comprising:

receiving dialing input to be used in originating a voice call from the mobile station;  
recognizing that the mobile station is busy in a circuit-switched data service;  
sending dialing information to the network via signaling on an existing traffic channel allocated to the circuit-switched data service; and  
responsive to return signaling from the network, retaining the existing traffic channel for use in the voice call.

25. The method of claim 24, wherein the return signaling from the network includes service renegotiation signaling, and wherein retaining the existing traffic channel for use the voice call comprises renegotiating the existing traffic channel to reconfigure it from data use to voice use.

26. The method of claim 24, further comprising providing an indication of call dialing to a user of the mobile station as would be provided in a normal call origination wherein dialing input is received from the user when the mobile station is in an idle condition.

27. A method of call handling in a mobile station for use in a wireless communication network, the method comprising:

carrying on a data call over an existing traffic channel; and  
renegotiating the existing traffic channel for voice call use responsive to signaling from the network; and  
changing from carrying on the data call to carrying on a voice call over the existing traffic channel.

28. The method of claim 27, wherein carrying on a data call over an existing traffic channel comprises carrying on a circuit-switched data call.

29. The method of claim 27, wherein carrying on a data call over an existing traffic channel comprises carrying on a packet data call, and wherein renegotiating the existing traffic channel for voice call use responsive to signaling from the network comprises:

receiving a call notification from the network via signaling on the existing traffic channel indicating that an incoming voice call is pending for the mobile station;  
returning a notification response to the network via signaling on the existing traffic channel based on prompting a user of the mobile station as to whether receipt of the incoming voice call is desired;  
sending and receiving signaling as needed to and from the network via the existing traffic channel to reconfigure it for voice use; and  
receiving an alert message from the network via signaling on the existing traffic channel indicating that the incoming voice call is set up and returning a call connect order to the network via signaling on the existing traffic channel.